AP019

Efficacy of defibrillation of different biphasic waveforms in high impedance porcine model

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Introduction: Impedance compensation methods and waveforms differ among manufacturers and can play an important role in defibrillation success. Aim of study is to compare efficacy of biphasic quasi-sinusoidal pulse (BQSP) with two truncated exponential pulses (BTEP) on high impedance porcine model.

Methods: We evaluated the threshold of defibrillation energy (TDE) in 7 anesthetized pigs (35–62 kg). TDE was defined as the lowest delivered energy that would terminate electrically induced 20 sec VF. MSIEE experimental defibrillator delivered BQSP, BTEP-1 – defibrillator Philips HeartStart MRx and BTEP-2 – Lifepak-12. MSIEE defibrillator compensates high impedance by controlling current with fixed pulse duration (10 ms), while the 2 defibrillators from the USA by prolonging the pulse duration (from 9 to $\geq$18 ms). The pulses shape and duration corresponded to load resistance 100 ohms regardless of pig chest impedance (41–52 ohms).

Results: TDE of BQSP (77.6$\pm$15.1 J) was significantly lower, than in BTP-1 by 25% (104.1$\pm$14.5 J) and in BTP-2 – by 29% (109.7$\pm$12.1 J), $p<0.02$.

Conclusions: The results demonstrate that for transthoracic impedance about 100 ohms the current-based compensation method was more effective than the duration-based compensation technique. The BQSP (named the Gurvich-Venin pulse) has been employed in Russia for about 40 years (clinical efficacy 90–115 J = 80–90%). The first Russian AEDs will generate the optimizing Gurvich-Venin pulse.

AP020

Therapeutic hypothermia after cardiac arrest: The role of neuron-specific enolase

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Background: Therapeutic Hypothermia (TH) has been shown to improve neurological outcome after cardiac arrest (CA). Biochemical markers such as neuron-specific enolase (NSE) seem to be promising to predict neurological outcome.

The aim of our study was to investigate the significance of serum NSE in patient after CA treated by TH.

Materials and Methods: from November 2010 to May 2011 we analysed consecutive patients admitted for CA treated with TH. The dosage of NSE was performed at 24 and 48 hours after return of spontaneous circulation.

Results: we evaluated 11 patients resuscitated from CA that underwent TH (10 males, mean age 65 years). Average NSE serum levels was 37 ug/L (median 22 ug/L). NSE peak serum value $<$20 ug/L was obtained in 4 patients with Glasgow Coma Scale (GCS) $\geq$14 (at 72 hours) that allowed a rapid extubation. All these patients were discharged with a cerebral performance categories (CPC) of 1. In 3 patients the NSE peak was between 20 and 35 ug/L, GCS at 72 hours was $\leq$13 and neurological recovery was slow (discharge CPC 1 or 2). Last patient had a NSE peak value of 116 ug/L; this patient died 20 days after CA. Univariate analysis showed favorable outcome ($p<0.05$) in patients who had witnesses public place CA and when CA to BLS time was $<$5 minutes. NSE serum levels were significantly lower in patients with discharge CPC $\leq$2 and 72 hours GCS $\geq$14 ($p<0.05$).

Conclusions: our experience shows that is possible to identify 3 types of patients: *rapid neurological recovery* for NSE value $\leq$20 ug/L, *slow neurological recovery* but potentially complete for NSE value between 20 and 35 ug/L, *adverse neurological outcome* for NSE values $>$35 ug/L. Therefore, the measurement of serum concentration of NSE after resuscitation seems to be very helpful to predict neurological outcome in these patients.

AP021

Efficiency of the dispatch center in the treatment of patients with cardiac arrest

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Aim: To determine the efficiency of the dispatch center (DC) in the treatment of patients with cardiac arrest without the presence of unique Emergency Medical Dispatch (EMD) protocol.

Materials and Methods: This research is retrospective end observational. It was conducted in the Institute for Emergency Medical Service Novi Sad in the period from 01 January 2010 to 31 December 2010. The survey included all patients in whom medical teams performed cardiopulmonary resuscitation (CPR).

Results: Medical teams have performed CPR for 198 patients in the studied period. In 142 (71.72%) received calls, orderly dispatcher have received information that the patient was unconscious. Reported reaction time I, by a dispatcher, for those specific calls amounted 1.37$\pm$1.27 minutes. According to data from the recorded interviews, average duration of calls between dispatcher and the caller was 61.37$\pm$31.13 seconds, and reaction time I was 138.2$\pm$103.02. In 6 (4.22%) cases the dispatcher sent out medical team before the conversation with the caller was ended. CPR measures were taken immediately in 30 (21.13%) of these patients, and 27 (19.01%) were successfully resuscitated prior to the arrival to the hospital. A layman was an eyewitness in 121 (85.21%) cases with cardiac arrest, and CPR measures were taken in only 13 (10.74%) of those patients before the arrival of the medical team. The dispatcher has given instructions for carrying out CPR measures in 3 (2.11%) cases.

Conclusion: In DC's where EMD protocols are not available, the duration of calls is prolongued, because dispatchers ask questions based on their own experience. Reaction time I is longer than two minutes because dispatcher must end the conversation with the caller before he is able to send out the medical team. In order to improve patient survival in cardiac arrest, DC's requires unique EMD protocols, modern information technology and continuous training of dispatchers.

AP022

Nationwide PAD installation improve chance of survival – A propensity score nearest matched analysis in Japan Utstain registry data

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Background: In Japan, sudden cardiac death has become a major problem. Although early defibrillation plays an important role on the chain of survival, previous nationwide study proved the effectiveness of PAD in the nationwide Utsein registry data. However, these data are not completely negligible a difference between the group backgrounds.

Objectives: Aim of this study was to investigate whether public AED installation promote sorely improvement of neurologic outcome on OHCA patients or not.

Material and Methods: From Jan. 1 2005 to Dec. 31 2009, total of 547,218 adults OHCA patients corrected from Japan Utsein registry record were used. Among them, 1222 patients received public-access AED (0.7% of total OHCA patients). To completely negligible a patients background, 1222 PAD(+) and 1222 PAD(−) patients were extracted and matched on a 1 to 1 basis using propensity score with nearest matching method. Matching criteria included cardiac etiology, witnessed, gender, age difference $<$2, and propensity score difference less than 0.01.Each pair was analyzed with conditional logistic regression to identify relative risk for those outcomes. The primary outcome measure was 1 month survival rate with favorable neurological outcome (CPC 1 or 2) secondary outcome measure was return of spontaneous circulation (ROSC) before arriving at hospital.

Results: There are no significant difference between the groups in age, gender (%), witness ratio (%), bystander CPR (%), response time and hospital arrival time. IV% advanced airway (%)and ALS procedure, also identical in the both groups. In the PAD group, shows significantly higher ROSC (33.9%) than that of non PAD group (23.6%). Again, In the PAD group, shows significantly higher CPC 1 or 2 (26.2%) than that of non PAD group (13.6%), respectively.

Conclusions: Nationwide public AED installation resulted in earlier administration of shocks results in an increase in the 1-month rate of survival with minimal neurologic impairment after an out-of-hospital cardiac arrest.